

--Cross Reference to Related Applications

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This application is a continuation of application serial no. 09/106,415, filed on June 29, 1998, now U.S. Patent no. 6,309,400, and is further ~~This application is~~ related to the following co-pending patent applications: Application Serial No. 09/106,686; Application Serial No. 09/106,028; and Application Serial No. 09/106,661, all of which are hereby incorporated herein by reference.--

In the Claims:

This listing of claims will replace all prior versions in the application:

Status of Claims

Claims 1-20 (previously canceled)

Please amend claims 21, 23, 28 and 30 as follows:

1 ~~21~~ **(currently amended)** A curved ultrasonic surgical end effector comprising:

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a concave treatment segment defining a first length comprising first and second side walls and a central ridge contiguous with the first length; and
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wherein the treatment segment is symmetrical about a plane bisecting the central ridge.

2 ~~22~~ **(previously added)** The curved ultrasonic surgical end effector according to Claim ~~21~~, wherein the ultrasonic end effector further comprises a convex bottom surface.

4 ~~23~~ **(currently amended)** A balanced ultrasonic surgical instrument comprising:

an ultrasonic transmission rod having a proximal end and a distal end; and
a balance region including first and second balance asymmetries wherein the balance region extends from a node point at the distal end of the ultrasonic transmission rod to a proximal end of a curved ultrasonic surgical end effector, wherein the curved ultrasonic surgical end effector further comprises a concave top

dbc2 surface defining a first length including a central ridge contiguous with the first length. E2

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24.(previously added) The balanced ultrasonic surgical instrument according to Claim 23, wherein the first and second balance asymmetries are positioned to counter torque created in the proximal end of the end effector by the curved ultrasonic surgical end effector.

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25.(previously added) The balanced ultrasonic surgical instrument according to Claim 24, wherein the first and second balance asymmetries are positioned such that transverse vibrations in the ultrasonic transmission rod are substantially equal to zero.

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26.(previously added) The balanced ultrasonic surgical instrument according to Claim 24 wherein the balance ratio of the transmission waveguide is less than 1:10.

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27.(previously added) The balanced ultrasonic surgical instrument according to Claim 26 wherein the balance ratio of the transmission waveguide is less than 1:200.
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28.(currently amended) The balanced ultrasonic surgical instrument according to Claim 23 wherein the curved end effector and the balance region are bisected by a plane of symmetry, the curved end effector being substantially symmetrical on either side of the plane of symmetry, the first balance asymmetry comprising a flat surface in the balance region wherein the first flat surface is substantially perpendicular to the plane of symmetry and the second balance asymmetry comprises a second flat surface in the balance region opposite the first flat surface wherein the second flat surface is substantially perpendicular to the second plane of symmetry.

10 29.(previously added) The balanced ultrasonic surgical instrument according to Claim 28⁹ wherein the first balance asymmetry is shorter than the second balance asymmetry.

14 30.(currently amended) A curved ultrasonic surgical end effector, wherein the curved ultrasonic end effector comprises:

a treatment region defining a first length and having a concave-shaped segment, the concave-shaped segment comprising first and second side walls and a central ridge contiguous with the first length; and

wherein the concave-shaped segment is symmetrical about a plane bisecting the central ridge.

3 31.(previously added) The curved ultrasonic surgical end effector according to Claim 2², wherein the convex bottom surface is wider than the central ridge.

B2 32.(previously added) The curved ultrasonic surgical end effector according to Claim 23⁴, wherein the ultrasonic end effector further comprises a convex bottom surface.

12 33.(previously added) The curved ultrasonic surgical end effector according to Claim 32¹¹, wherein the convex bottom surface is wider than the central ridge.

13 34.(previously added) The balanced ultrasonic surgical instrument according to Claim 23⁴, wherein the first and second balance asymmetries are symmetrical about a plane bisecting the central ridge.